VOLUME VIII NUMBER 7

THE ELEMENTARY SCHOOL TEACHER

MARCH, 1908

THE SCHOOL'S RESPONSIBILITY FOR DEVELOPING THE CONTROLS OF CONDUCT[1]

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Not long ago I read a newspaper anecdote that will, I think, make clear the character of the problem that I wish to discuss with you. I do not know whether this anecdote is a record of an actual occurrence or merely a bit of imaginative space-filling. In either case, however, it will serve my purpose. It had reference to the long list of railroad accidents that was just then horrifying the country, and it told the story of a young telegraph operator who had been brought to trial on the charge of criminal negligence. It appeared from the evidence that a serious disaster had occurred as a direct result of this young man's failure to perform the duty that had been assigned him, and it further appeared that his failure was due to no other factor than that which, for want of a more definite term, we call "carelessness." The attorney for the defense sought to establish the young man's good character by the testimony of a number of men and women who had been the defendant's teachers when he was a boy at school. He called one of these teachers to the witness stand and asked him this question: "What kind of a boy was the defendant?" And the witness replied that he had been a very good boy—diligent in his studies, never mischievous, and always companionable with his fellow-pupils and popular

[1] A lecture delivered before the College of Education, The University of Chicago, November 21, 1907.

with his instructors. As the witness gave his testimony, the face of the defendant brightened and his attorney smiled hopefully. But when the defense had completed the direct examination and the prosecuting attorney began the cross-questioning, the bright looks vanished and the smile was changed to a frown. For, after repeating the question of his colleague and receiving the same answer, the prosecuting attorney suddenly turned upon the witness and asked: "Was this young man a careless boy at school? Was he what you would call a careless pupil?" And the witness, after an awkward hesitation, finally admitted that the boy had been a little careless, but was, withal, a good boy and an exemplary pupil. "But," persisted the attorney, "what did you do to change him in this respect? Having recognized his carelessness, what did you do to break up his bad habits and replace them with better habits?" And the witness, reluctantly and with not a little confusion, was finally compelled to answer, "Nothing!"

Now, as I have intimated, this little anecdote may be purely imaginative, but it certainly raises a possible question with regard to the functions and responsibilities of education that cannot be brushed to one side as irrelevant and impractical. After all, what is education for? We have advanced far beyond the point where we thought of education as chiefly concerned with the acquisition of knowledge—with the cramming of the mind with facts and theories and laws and principles. We have got beyond the primitive conception of education as the process by means of which youth is endowed with certain "earmarks" of culture. We have left these inadequate conceptions behind, and have gradually come to the much broader view that education must fit the child for life and work and service and production in a complex social environment to the demands of which nature has very imperfectly adapted him. Social efficiency, formulated though it may be in diverse ways, is becoming the conscious aim of all educational effort.

As a result of this development, education is coming to its own as a human institution. As one writer has intimated, it has attained to its majority and is coming into its kingdom.

And as in individuals, so in institutions, the first sign of approaching maturity is a hypertrophied self-consciousness. Like the adolescent youth, education is filled with a deep sense of its power, a yearning to know and test its function, an analytic impulse which leads it to unravel its mysteries, and to organize its efforts with foresight and intelligence toward the goal that it seeks to attain. And with these longings and strivings and yearnings, if I may continue the metaphor, is mingled now and then an undertone of foreboding, as if the task that lay before it were too stupendous for its powers; as if the problem that had been set it for solution—by far the most intricate and complicated that any human institution has yet attempted—were much too intricate and complicated for any human institution to solve. And so we find, now and then, an expression of pessimism, just as we find a marked tendency toward pessimism in individual adolescence—a tendency to distrust the power that education possesses, a temptation to repudiate nurture and hark back to nature, to discount the forces of the environment and magnify those of heredity, to take but a half-hearted hope in the school while we await, as patiently as we can, the arrival of the superman.

There can be no doubt that just such reflections upon the worth and efficiency of school training as that expressed by the prosecuting attorney of my anecdote contribute no small share to whatever pessimism one may feel. In what measure must the school hold itself responsible for the failure of its products to meet the demands imposed by social and industrial conditions? It would seem perfectly obvious that the effort of the teacher is quite without value unless, in some way or another, it modifies the conduct of his pupils. If those who come to me for instruction and training act in no way more effectively after they leave me than they would have acted had they never come under my influence, my work as a teacher must be adjudged a failure. Certainly if they act less effectively, my work is more than a failure —it is a catastrophe. And furthermore the fact that I could not foresee the results, the fact that I did my duty as I saw it, might mitigate the blame, but it could in no way mitigate the

catastrophe. The pathetic lament of one of the greatest of our university presidents over the fact that so many of the men who figured prominently in the recent scandals of the business world were graduates of his own institution is a sad commentary on the failure of what we believe to be the most efficient training effectively to dominate or control conduct in really critical situations. And the terse criticism of my prosecuting attorney, whether the anecdote be fact or fiction, could find an easy sanction in the minds of thousands of business men who are looking to the schools for the raw material of efficient service.

Now it is clear that the responsibility of the school for the development of the controls of conduct must depend upon the degree in which the factors of control can be developed by the educative forces of the school. It is easy to make an offhand judgment in either direction. We can assume that the telegrapher's carelessness was due to a bad heredity, or to an inadequate home training, or to forces that operated after he left school. It would be hard to prove that all or even one of these factors could not be accounted sufficiently strong to counteract the results of school training. On the other hand, one might reasonably assert that the telegrapher's inefficiency was manifestly due to the lack of a certain set of habits which school work can and must develop, and that the admission of his teachers that these habits had been neglected is a sufficient evidence of their culpability.

It is a platitude to say that nine-tenths of human conduct is determined by the factor of habit. Educational theory has always recognized this basic truth, and, in a certain sense, it has always recognized the duty of the school to develop efficient habits. But even now educational theory is far from a due appreciation either of the wide scope or of the tremendous difficulty of the task. Indeed, until recently, educational methods, while assuming that habits were to be developed, seemed to have but a vague conception of what the development of a habit really means. One may cite the habits of speech as a convenient and definite illustration. It is only within a few years that futility of mere grammatical instruction in improving the efficiency of

expression has been fully recognized. True, the study of formal grammar taught the pupil certain rules and principles that should have operated in the formation of efficient habits of expression—and doubtless did so operate in rare instances. But the kernel of habit—the purely automatic and unconscious character of its reaction—was very far from an effective recognition. When the futility of grammatical instruction was generally agreed upon, a reform movement took, as is usually the case, quite the opposite direction. It was grammar that was at fault, consequently there must be no grammar. Its place must be taken by language lessons, and since the essence of grammar is its logical coherence and organization, so the more incoherent and illogical the language lessons could be made, the greater would be the chance that they would correct the old defects. But this, quite naturally, was found to make matters worse instead of better. After all, the trouble did not lie in the mere matter of logical organization. That, in itself, was found to have rather a beneficial influence. The real difficulty lay in the comparative ease of mastering general principles and the extreme difficulty of applying these principles over and over again until the appropriate forms became thoroughly automatic. And so the next reform brought in a new factor: It attempted to provide a motive for application and repetition. The teacher of language turned to the content subjects for more interesting material, and attempted in various ways to inspire the pupil with a desire for correct expression. But this has been a long and tedious road to travel, and the results are still far from satisfactory.

I instance this specific habit of expression simply to press my point, and my point is this: If education finds it so difficult to build efficient habits in a comparatively simple field, dealing with very tangible and definite reactions, how much more difficult will be its task in the broader fields, such, for example, as that represented by the telegrapher's inadequacy in "habits of carefulness?"

And if the problem which seemed on its surface so simple has already proved so difficult what shall we say when we find that

it is still further complicated by a much more important factor? Until recently it has been assumed that a habit, once established, would continue to operate in all situations of life wherever it might be needed. That this assumption failed to work out in practice did not seem to invalidate it in the least. Entire curricula were constructed under the guidance of the dogma that specific habits could be generalized indefinitely. The child might be disciplined into the most effective habits of promptness in the school, and yet fail to meet his first business engagement upon the stroke of the clock; the youth might be trained to reason with unerring certainty in his geometry, and yet fail to evince the slightest evidence of that ability in his later adjustments in business; the college student might win high honors in the study of the observational sciences, and yet find his trained observation incompetent to detect corruption in politics and chicanery in finance. These practical tests of the doctrine of formal discipline in its naïve formulation have failed upon every hand, and yet the doctrine has died a hard death—in fact, it is still far from inanimate even in contemporary educational theory and practice. But experimental investigation has clearly revealed its inadequacy. We can hammer away at tardiness until our record is perfect, and yet we cannot be sure that our pupils will be any more prompt in meeting their out-of-school engagements than will the pupils of our neighbor, whose class record is the disgrace of the school. We may drill upon correct expression until not an erroneous form creeps into our recitations, and still not know whether the first words that our pupils utter when they go out upon the playground—much less into the walks of adult life—may not represent enough samples of false syntax to satisfy the demands of even the old grammarians. And even though the telegrapher's teachers might have drilled him into the most efficient habits of carefulness and attention in his school work, we could not assume that these would *necessarily* function, even the slightest degree, in his later work. In other words, the mere formation of a specific habit or of a set of specific habits is not in itself a conclusive proof that these habits

will function in situations other than those in which they have been formed, or in closely parallel situations.

On the surface, all of this seems to justify nothing but the most hopeless sort of an outlook. Truly, if formal discipline is an impossible task—if habits are adequate only to the situations in which they have been formed—what we call general education must be in a very bad way. The school must restrict its function to matters of instruction, and even in these it must assume no value other than that which accrues intrinsically to the facts and principles learned. In this case, it is safe to predict that all training must become technical and vocational, and I think that I am safe in saying that there is at present a well-marked tendency toward this very end. The college and university reveal this tendency most clearly, but the high schools are coming to feel its influence. The traditional courses which were supposed to provide general culture and discipline are being replaced by courses that are more or less vocational in character.

Even in the elementary school, the rejection of the dogma of formal discipline is exerting a modifying influence. The methods that were formerly assumed to develop the stern virtues of accuracy and industry and duty and obedience have, in many cases, been discarded or greatly modified. Indeed, why subject the pupil to the hardships of a discipline not needed for immediate ends when the chances are so few that this discipline can be applied to remote ends? Why insist upon obedience, if the habits of obedience gained in the school cannot be generalized into the attitude of respect for law and authority, upon which every civilized government must depend for survival? True, hoodlumism is increasing at an alarming rate. True, the American child is becoming more and more a law unto himself and not infrequently a source of trial and tribulation to the adult members of society. The old-fashioned parent would have settled the difficulty in a trice, but should one inflict pain upon another merely to subserve the interests of one's own comfort, when science asserts that no remote end would be gained thereby and that irremediable injury might be caused? We could formerly justify heroic measures of discipline on the ground that our

personal comfort was only an incident and that it was the remote end of civilizing the little savage that impelled us to take harsh measures. But now selfishness is the only excuse.

What is the responsibility of the school (or even of the home) for developing the controls of conduct? In the light of contemporary educational theory, one is forced to answer, Nil. Responsibility goes only with power, and power is plainly denied us—at least if the contemporary theory is valid.

But is it valid? and if not, what is its fallacy? After all, have we generalized too hastily? Have we discarded the dogma of formal discipline and repudiated the value of general training with insufficient consideration? Have we really accounted for every possible factor that might influence our judgment?

Personally, while I believe that those who still cling to the dogma in its original form cannot justify their position, I also believe that those who have entirely cast aside the idea of formal training have done so too hastily. In fact, there is now some basis for a reactionary movement in the experiments which seem to indicate that memory, for example, can be markedly improved by exercises of a very formal nature. But aside from this there is still another factor that has been neglected.

In order to make clear my own position upon this matter, let me refer to a type of conduct rather different from those just discussed. Why are you and I decent and peaceful and law-abiding —assuming, of course, that we are. Why do you and I refrain from doing unseemly things? If we were brought face to face with that question, I believe that most of us would answer that we do not do unseemly things because reason tells us not to. But this is probably far from the real truth. You and I and the rest of the men and women who live ordinarily decent lives do so very largely through the force of habit. Let us suppose that you are in a jewelry store and that you see a tray of beautiful and costly diamond rings lying upon the top of the showcase. The clerks are busy in another part of the store, and you examine these rings casually and yet admiringly. Let us suppose that you have long wished to possess a diamond ring the

very counterpart of one that is right there within your reach. Why do you not slip the ring into your pocket? Let us assume that you would run absolutely no danger of detection in the theft. You tell me that your judgment tells you that this would be stealing; but judgment in your case and in mine, I hope, very seldom operates in a situation like this. As a matter of fact, you do not feel the slightest temptation to take the ring. Why? Simply because habits of honesty have been drilled into you from the earliest infancy. There is little judgment involved in the control of conduct in such a situation, because the demand for judgment is not present. In reality, there is no situation there. A situation might arise under the proper conditions. Nature tells you to appropriate the thing that pleases you. But civilized society tells you to respect the rights of others, and civilized society has been having the better of it for so long that the primitive, natural craving has been quite hushed. In short, if you and I had constantly to reason ourselves into being good, we should not be good very long. We are either good by habit or we go to the bad very quickly.

Now this, it will be agreed, approaches very close to what may be termed a general habit—to the very thing that formal discipline was supposed to engender. How has this habit been formed? Obviously not from specific experiences in that identical situation. You do not need to have suffered painful consequences for the theft of diamond rings in order to build up the habit of not appropriating diamond rings when you want them.

In order to envisage a possible solution of this problem, let us vary the conditions of the illustration. Let us assume that, instead of feeling no temptation to take the ring, one does feel the very slightest impulse. In other words, let us assume that habit is inadequate to the solution of the situation. Inherited impulse, left to itself, would solve the situation disastrously. What is it that checks and controls this impulse? Is it an intellectual judgment—this act is stealing; stealing is a sin; consequently I will inhibit the impulse? I venture to say that, if the judgment were of this bare intellectual type, it would exert not

the slightest inhibiting force upon the impulse. What really determines conduct in such a situation is undoubtedly an *emotional wave*—an undefined and intangible, but thoroughly conscious, *feeling of repugnance* for the act itself. Let me ask if this is not a fair description of the controlling force in your own moments of temptation—if you ever have such moments. Impulse and emotion are so closely related as genetically not to be distinguishable; and unless one can oppose an inherited impulse with an idea that is just as powerfully colored with emotion, the impulse is bound to conquer. The idea alone, as a product of intellection, has not the weight of a feather in determining conduct in critical situations. It is the emotionalized idea —it is the *ideal*—that must hold the reins of conduct when instinct is battling for the control.

And this, it seems to me, is the explanation of the barrenness of our attempts to teach morality from the didactic standpoint. We see it coming out most clearly perhaps in that horrible example of pedagogical inefficiency that we call temperance physiology. In eight years of didactic instruction in temperance, the teacher usually accomplishes less in developing real controls of conduct, even in children whose plasticity and adaptability are the hope of the race, than an unlettered temperance reformer, with the fire of enthusiasm coursing through his veins, can accomplish in a single hour with adults who might reasonably be supposed to have every factor of control irrevocably fixed. This is the reason, also, that didactic ethics has so little influence in modifying the conduct of its students. This is why every attempt to read emotion out of religion has weakened the power of the church in controlling the conduct of its communicants. The power of an efficient incentive to action is always a direct function of the emotion that is back of it.

What term will most adequately describe the prime controls of conduct—the factors that govern adjustment in really critical situations? The term that I propose is this, "emotionalized prejudice." The adjective may be redundant, but I insert it in order that there may be no doubt as to the prime factor.

A man of science was once trying to persuade me that the

trend of mental progress was toward the elimination of the emotions. As an illustration, he adduced his own clear-thinking logic engine of a mind, the workings of which, he assured me, had not the slightest emotional tinge. I could easily find it in my heart to pardon his egotism, for, with his next breath, he exclaimed passionately, "I am a priest of truth, and I worship the naked fact!" Not having with me the instruments of exact measurements with which emotions may be identified, I could not convince him that his mind was, at that moment, surcharged with a powerful affective process—but I convinced myself. And surely if the training that we give to students in science amounts to anything more than a mastery of technique and the assimilation of a few technical facts and principles, it must amount to this: the development of a prejudice, highly colored with positive emotional force, toward truth and veracity and impersonal observation and dispassionate judgment—*an emotional attitude against emotion, a prejudice against prejudice.* And similarly I should maintain that the student of mathematics should come from his study of algebra and geometry and calculus with a highly emotionalized prejudice toward that method of close, logical thinking that mathematics, above all other disciplines, represents.

It is true that not all students derive these prejudices from the pursuit of mathematics and science. Mastery of subject-matter does not involve this as a necessary consequence. But to some students, a long acquaintance with, and contemplation of, the methods by which some of man's greatest conquests over nature have been made possible give a profound sense of the worth and value of these methods—a feeling of respect and perhaps of reverence which supplies the emotional coloring essential to the modification of conduct in later adjustments. And I am certain that the efficiency of such a prejudice is a function, in part at least, of the time and effort that have been given to the mastery of the subject. After all, the things that appeal to us most strongly from the emotional aspect are the things that we have gained at the cost of effort and struggle; and the belief that the "tough" subjects of the curriculum have

the greatest disciplinary value has a psychological basis in this fact.

I am here speaking of no vague, indefinite "mental power" or "mental faculty" that may be developed by the studies. The factor to which I refer may be intangible and elusive, but I maintain that it is thoroughly consistent with the accepted principles of modern psychology. The consciousness of power is often as important in gaining a victory as the possession of power. Indeed, it is the emotional force of a belief that renders the power itself dynamic rather than potential. The graduate of Cambridge may never use his mathematics in solving the situations of his later life, but it is possible that he has gained something from his mastery of mathematics that will help him more in solving a situation than he could be helped by any amount of instruction regarding the technique of that situation. The "something" that he has perhaps gained is a consciousness of conquest, or, if I may use a street phrase, the knowledge that he has been "up against" the "toughest" problems that the mind of mind can devise and has come out a victor. Certainly his mastery of mathematics does not necessarily involve this feeling of confidence; but it *may* involve it, and, in case it does, there can be no doubt of its value in making his future adjustments more efficient.

This does not mean, of course, that one would decry the virtue of that technical and vocational education which aims to furnish specific facts and principles for the solution of specific situations. I assert simply this: that far more fundamental than the technical facts are the prejudices in favor of dogged persistence, unflinching application, relentless industry, and a determination to conquer, whatever the cost. These combined with technical knowledge and skill can spell nothing less than efficiency. Without technical knowledge, they might ultimately win, but the price of victory would be unnecessarily high and the chances of failure much greater. But technical knowledge alone without these other factors must spell disaster in every critical situation.

And I should not say that these prejudices which are so

important cannot be engendered through the processes of education that give one technical knowledge and skill. I believe, however, that, as a rule, applied science is frequently less efficient, in this respect, than pure science, and applied mathematics than pure mathematics. Pure science and pure mathematics constantly emphasize the system and unity of the subject-matter. In a certain sense, the contemplation of a large system of knowledge has much in common with the contemplation of a great work of art. It is a unity in which every part is definitely related to every other part, in which there are no gaps, or lacunae, or jagged edges. And the emotional factor, I believe, is a function, in part, of this aesthetic quality—but I should not press this point.

But there still remains unanswered a question that was raised a little way back. Granting that emotionalized prejudices of a very effective sort may be engendered in the study of science and mathematics, what shall we say with regard to the generalization of specific habits such as those formed in the earlier stages of education? What is the value of disciplining the child into specific habits of promptness, or neatness, or accuracy? Will specific training give rise to emotionalized prejudices in favor of the virtues that the discipline represents? If it does, there can be no doubt that the effects of training may be generalized or carried over to situations other than those in which the training has been given.

Personally, I believe that we get most of our effective prejudices from just this source of early training, but it is, of course, true that the specific habits might be very adequately formed without at the same time engendering the corresponding prejudices. The indeterminate factor is the emotional factor. The discipline of the early home life is the great breeding ground of prejudices *because of the positive and profound emotional factors that operate.* (I mean by "positive" factors those that operate in favor of the virtues in question.) The most powerful prejudices upon which civilized society rests are engendered in the home—honesty, cleanliness, decency, self-denial. Except as these are taught by precept and example, and

fortified by specific habits, and thoroughly imbued with positive emotional force, the social fabric must surely fall to pieces.

It is for these prejudices in particular that the home must be responsible. The school can do little to develop them unless the school takes over all of the educative functions of the home, and even then the weakness of the most important factor of all —the emotional factor—is apt to make the attempt abortive. But the school in turn must stand sponsor for certain prejudices that the home cannot always be depended upon to engender, and among these one must certainly include accuracy, promptness, industry, application, efficiency, order, respect for the rights and feelings of others, respect for authority, for truth, and for justice.

The important point is this: The specific habits which have reference to these various virtues are insufficient; *it is the prejudice in their favor that is the significant thing.* And this explains in part the failure of our older methods of teaching to develop efficient controls. We thought that the habit was the prime essential. We neglected the prejudice. And so we took the shortest road to the habit, forgetting that we might thereby be inducing a prejudice of quite the opposite kind—forgetting that *prejudices not only generalize habits, but sometimes negate them.* And so the net result has been very frequently to promote the very end that we sought to avoid. A prejudice against work and application and concentrated attention has often been engendered by the heart-rending, back-breaking grind of toil imposed upon the child of the farm. A prejudice against morality has been developed more than once, I believe, by the namby-pamby methods of the Sunday school. And I am more than tolerably certain that a prejudice against temperance has been promoted, in many cases, by the methods that we have taken to build temperate habits.

Again it is the emotional factor that must be considered, and this sometimes works in the most unexpected ways. Do we believe that imposing difficult tasks upon the pupil will develop in him that prejudice in favor of persistence and application and close, sustained attention, which is so necessary in meeting the

situations of later life? How do we know that, instead of this, we are not developing its antithesis, and that he will not acquire a repugnance for these virtues? Do we believe that we can avoid the difficulty by catering to his interests? How do we know that we shall not develop a prejudice against all effort that is not bribed and all tasks that are not attractive? Or, do we wish to put the pupil into an habitual attitude of respect for authority? How can we be certain that we do not overshoot the mark, and make him a subservient tool, lacking in all initiative? Do we try to obviate this difficulty by leaving his inherited impulses to work themselves out without let or hindrance? How do we know that the liberty of childhood may not engender a prejudice in favor of license in manhood? Are these merely academic questions? Ask any principal of an elementary school who is face to face with the responsibility for governing five hundred children and who is endowed with both a brain and a heart. It is precisely these problems that such a man must attempt to solve at every turn of the day's work.

One can find no better example of the difficulty of solving these problems than is presented in the one department of education in which we have consciously attempted to develop an emotionalized prejudice, namely, the teaching of literature. From present indications, it would seem that our attempt to force upon the child an appreciation of art in any of its forms has been most barren in its results. The music hall still holds forth its allurements in spite of our costly experiment in public-school music. The variety stage draws with its blandishments those who have been carefully taught how to enjoy Shakspere. All the garish distractions of our great cities prosper on the earnings, not of our unlettered immigrants, but of the products of our own public schools.

Have we not in this problem of developing prejudices both the most important and the most difficult problem of educational science? Is it not the crux of the whole question of moral education? Is it not the most significant factor in social improvement? Should it not receive adequate recognition in the present

radical reconstructions to which the curricula of our high schools and colleges are being subjected?

Obviously enough, the key to the situation lies in the emotional factors; but here, unhappily, we need a key that will unlock the key. At the very outset, we confront a danger that will do much to defeat our purpose. I refer to the danger of sentimentalism. Our present conception of the emotional life is far too narrow and restricted to serve as a basis for fruitful investigation from the standpoint that I have proposed. In popular use, the word "emotion" is heavily freighted with associations that make it a veritable bugbear for scientific research. And no small source of the negative prejudices that we are now developing in education is this silly, sentimental recognition of the emotional factors so-called that is little less than disgusting to the serious and self-respecting student. If you wish to give a boy a first-class prejudice against nature, put him through the average course in nature-study that has for its object the development of a love for nature's beauty. What the true emotional nature of the boy craves is not something to love, but something to respect. Love is a word that ought always to be in our hearts, but seldom upon our lips, lest we cheapen the sentiment by constant reiteration. And the emotional factors to which we give the name "love" function in only a weakened form prior to puberty, and even after puberty, the less ado that we make about them in education, the more completely, I believe, will their ideal elements emerge from the background of instinct and become positive forces in the control of conduct. Just now we hear upon every side that the child must love his school, he must love his work, he must love his teacher, he must love literature, he must love art, he must love nature; but we never hear that he must respect anything, except (and this only by implication) his own whims and fancies. Now respect is just as thoroughly a sentiment as is love, and with the preadolescent child, it is based upon a far more powerful emotion. I might also add, although I may seem unorthodox, that the only kind of love worth having is the kind that grows out of respect.

Now this is far from saying that the teacher should not have

a genuine affection for his pupils. Love of that type comes from the other side and is based upon parental instincts—paternal or maternal—that are fundamental. The person who does not feel the power of these instincts is abnormal, and certainly has no place among teachers.

And so the first step in the solution of our problem must be an investigation of the emotional forces that govern conduct—using the term emotion in the very broad sense that I have suggested. This will be no simple task, but the full investment of education with scientific dignity and worth must await its outcome. We must come to know in a fairly definite and concise form the number and sources of these great controls of conduct. Now we know them only in the vaguest fashion. We know that there are certain emotionalized ideas, like the principle of religious liberty, or the principle of equality under the law, which have dominated councils of war and stained battle fields; that there are certain emotionalized standards, like honesty and chastity and personal honor, which not infrequently determine the greatest and most critical of individual adjustments; that there are certain powerfully emotionalized abstractions, like truth, or faith, or service, which may map out the entire trend of a man's life and mark the clear path of his career; that there are certain profoundly emotionalized conceptions, like friendship, or motherhood, or divinity, which only not quite defy the words of a David or a Job to formulate, or the pigments of a Raphael to depict, but which still lie somewhere deeply imbedded in every human motive that makes for what we call the right. Of these, at present, we can say with certainty only this: that somewhere during that long period of human plasticity which we call childhood and youth, they are implanted in the heart, there to work out into action and bring forth fruit of their kind. Now perhaps the seeds are sown by precept and admonition; now by objective example and conscious imitation; now by long years of growth and training and discipline; now by a sudden flash of inspiration. Many, and these doubtless the most potent, come from the home, others from the social environment, others from religion, others from the *Zeitgeist,* others from literature and art

and history and biography. But some must surely come from the school, and in all of them the influence of the school must be felt. Whether we will or no, we cannot escape the responsibility.

And even if the more accurate investigations are still to be made, the very recognition of the importance of these factors should have its effect upon the actual work of teaching. When the teacher asks himself not only what he wishes to impart in the way of knowledge and train in the way of habits, but also what sort of prejudices and what sort of standards and what sort of ideals he wishes to give his pupils, the very attitude of questioning will, I believe, modify his work in the direction of greater efficiency. We cannot all be teachers like Pestalozzi or Froebel or Arnold or Sheldon or Parker, but we can all appreciate the characteristic that made these men masters of their craft. We can know that they were great and influential, not merely because of the knowledge that they possessed, but far more fundamentally because of the ideals with which they were inspired, and that their influence was due to the facility and skill with which they could pass on this inspiration to their pupils. And, knowing this, we, too, may be encouraged to strive for idealism to the end that our pupils may feel, however feebly, the uplift, and catch a glimpse, however fleeting of the sunlit peaks.

THE DEEPER AND THE RICHER MEANINGS OF MATHEMATICAL TEACHING IN ELEMENTARY SCHOOLS. II

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College of Education

GOOD ARITHMETIC TEACHING IS A TRAINING IN CHOICE

I have said that many ways of doing things in arithmetic should be taught; because there is a widespread disposition among teachers to talk and teach as though there were only *one* way to do an arithmetical problem, and that all that needs be done is to learn this one way. The old-time notion that there is one method for addition, one for subtraction, etc., was the foster-parent of the method-haggling, and device-hunting that so dominated and mechanized arithmetic work in the recent past. But this is the day of the open-door policy in the matter of method and device. They are now regarded only as means to the great end of thinking. Some teachers can render the highest service through one type of method, others become more effective through another type. As with teachers so with pupils. Some pupils will more readily grasp the underlying thought through one type of presentation, and others through another type. The good teacher must have at his finger-tips many ways of exhibiting the truth being taught, and must have great resourcefulness and tact in their use. There must be more openmindedness, more mental springiness, more flexibility in the use of method and device in the schoolroom. The essential question with all method is: *to what extent does it deepen interest and clarify, intensify, and facilitate thought?*

As just suggested, different methods will meet this crucial question with varying degrees of success with different pupils. Pupils must therefore be given latitude of choice as to their methods of attacking and of working problems.

But choosing, to be effective, must be rationalized and liberated by a knowledge of the reasons on which the choice is made,

and guided and steadied by suitable standards for estimating the relative merits of choices. One all-embracing standard of judgment for choosing is the principle of ease of action. This is always available for elementary-school mathematics. It throws the choice sometimes in favor of this method, and sometimes in favor of that. If the textbook has been properly written it will not fix upon a single method for each process, then carefully manufacture problems to exemplify this method to the exclusion of all others. With good teaching, problems are selected to exhibit conditions under which this or that method is the more convenient, the more advantageous; and care will always be taken that these problems shall cover fairly well the ground of the situations that arise most frequently in common affairs. The pedagogic aim must ever be so to open up and exhibit the thinking of an arithmetical topic, that its thought-values shall spread out into other than pure arithmetical fields. This is what we call the culture-value of mathematics.

Choice must also be liberated. The pupil who knows only one way suffers constraint in choosing. He necessarily takes the only route that promises a way out. In strictness he does not choose; because he cannot. He either blindly follows, or is driven. This is the necessary outcome of one-method teaching. To prevent this driving, sometimes miscalled teaching, teachers must qualify masterfully to teach pupils to choose from among different available methods of attacking and of solving problems; to choose the order of processes used in a given problem; to choose the best way of executing the several processes, and to some extent to choose problem-material. Then will arithmetic become a powerful factor in training for rational choosing in life's emergencies, and strong willing inevitably follows right choosing. Good conduct, good morals, are simply the sum-total of correct choices. Verily, good arithmetic teaching conduces to good character and right conduct.

To specify concrete opportunities, the following enumeration of alternatives of choice will serve to suggest the scope of available materials for choice:

Sums to be obtained by adding (1) upward; (2) downward;

(3) horizontally; (4) columns by parts, then the sums of the parts; (5) footing tables vertically and horizontally; (6) horizontally and vertically; (7) by grouping into 10's, 20's, etc.

Differences to be found (1) the usual way; (2) by making-up method; (3) with subtrahend over minuend; (4) subtrahend beside minuend; (5) increasing the subtrahend digit; (6) subtracting from left to right.

Products to be found (1) the usual way; (2) left-to-right multiplication; (3) by factors of multiplier; (4) by parts of multiplier, as $25 \times 36 = 20 \times 36 + 5 \times 36 = 30 \times 25 + 6 \times 25$, etc.; (5) by aliquot parts of 100, 1,000, etc.

Quotients to be found by dividing (1) the usual way; (2) quotient over dividend; (3) by factors of divisor; (4) by aliquot parts; (5) taking common factors out of dividend and divisor.

COMMON FRACTIONS

Fractions should be added and substracted—

1. By measurement exercises with common standards.

2. By divided lines, squares, oblongs, circles, etc.

3. By brisk formal exercises such as—

a) How many fourths in 1/2? In 2/2?

b) How many fourths in 1/2 and 1/4? In 1/2+2/4? In 1/2 +3/4?

c) How many fourths in 1/2 less 1/4? In 1/2+2/4? In 1/2 +3/4?

d) How many sixths in 1/3? 2/3? 3/3?

e) How many sixths in 1/3+1/6? In 1/3+2/6? In 2/3+1/6? In 2/3+2/6?

f) How many sixths in 1/3−1/6? In 2/3−1/6? In 2/3−2/6? In 5/6−1/3?

4. By the customary formal procedure.

Fractions should be multiplied—

1. By use of common standards of distance, area, bulk, capacity, weight, time, etc.

2. By divided lines, squares, oblongs, circles, etc.

3. By the customary formal procedure, first using "of" for times symbol, and later, using "times." (Distinction of partition from division is strongly advised against.)

4. Check multiplications by reversing steps.

Fractions should be divided—

1. By measurement with common standards.

2. By aid of dividing lines, squares, oblongs, circles, etc.

3. By getting common denominators, and comparing numerators.

4. By the process of inverting divisor and multiplying, rationally presented.

5. Check division by multiplying.

NOTE.—Multiplications and divisions of fractions must be as systematically and persistently checked as are the processes with whole numbers. Cancellation is of great service in this checking.

DECIMAL FRACTIONS

The meaning of a decimal fraction should be taught by relating it—

1. To whole numbers, as with monetary values, or with metric units.

2. To common fractions, as $\frac{1}{4}$=how many hundredths? etc.

3. To the system of decimal notation for integers.

After showing that the point is only a means of "pointing out" which digit, or figure denotes ones, or units, all that is needed for decimal addition and subtraction is to proceed precisely as with whole numbers, and to point the sum or difference so that the points all stand in a vertical line.

In multiplication of decimals, the pointing is a little more difficult. Here the point should be located—

1. By writing easy decimals in common fraction form, and multiplying, then, writing the product in the decimal form.

2. By multiplying as with integers, and then, by shifting the point on the principle that $\frac{1}{10}$, $\frac{1}{100}$, etc., of multiplicand or multiplier must give $\frac{1}{10}$, $\frac{1}{100}$, etc., of the product.

3. By the customary mechanical procedure, checking by deciding roughly about what the result must be.

In division, the quotient should be pointed by dividing through as with whole numbers and then—

1. Marking off in some way as many places in the dividend as there are decimal figures in the divisor, and noting that the

quotient figures are figures of a whole number until this place is reached.

$$23.5)\frac{8.164}{203.04}$$

2. Shifting the point over the same number of figures in both dividend and divisor until there is but one figure to the left of the point in the divisor, and then ask, About what is ½, ⅓, ¼, etc., of the modified dividend, pointing the quotient number so as to make it as near this estimated quotient as possible, by pointing alone.

EXAMPLE

203.04 divided by 2.35 = ?

$$2.35)\frac{8.64}{20.304}$$

3. The customary procedure, checking the pointing by estimating roughly about what the result must be.

If time permitted I would indicate for percentage and interest and mensuration similar alternatives of procedure which should be made available to grade pupils. But a word to the wise is sufficient.

SPEED AND ACCURACY

Many teachers who glibly profess themselves seeking to secure "speed and accuracy in figuring" are unfortunately not succeeding in securing either, if we may credit recent findings of both local and foreign observers. If the animating idea of teachers of arithmetic could be ascertained, I dare say that in most cases, it would be found that the thing they are actually striving to develop, instead of accuracy, is only a sort of technical deftness, or mechanical precision as to the externals of process; and, instead of speed, the thing actually produced is nervousness, feverishness, and fidgetiness. So faded, so hackneyed has the phrase "speed and accuracy" become through canting speech and canting acts, that the terms "speed" and "accuracy" need reinforming with new life and meaning. The good old wine very much needs new bottles.

I wish to attempt a closer specification than is prevalent of the meaning of these terms for arithmetic teaching. Definitions, of

course, do not necessarily help classroom practice. Only such definitions influence practice as become organic to the thought-process of the practitioner. Definitions are, therefore, merely conditions precedent—not conditions sufficient—to good practice.

WHAT IS ACCURACY?

In the first place, accuracy in arithmetic is a matter of the mind. An act of thought is its *sine qua non.* No conception of accuracy can be generated in the learner, nor can the habit of accuracy be fostered, without thinking on the learner's part. One remembers or he does not remember. "He remembers inaccurately" is a contradiction, and "He remembers accurately" is tautology. There are no gradations of remembering. This is particularly true of formal number facts. They may, perhaps, be remembered perfectly or imperfectly; but not accurately or inaccurately. Pure memorizing touches accuracy vere remotely. On the contrary, there are degrees of accuracy and of inaccuracy. But the type of accuracy that has meaning for arithmetic involves the judgment.

In the next place, judgments are based on comparisons, and comparing judgments is thinking. Arithmetical accuracy involves two elements, one external and the other internal. The internal element is an idea, mental operation, or a judgment. The external element is its expression, usually in the form of a symbol or of a mechanical process. The two factors that are always present, always an organic part of arithmetical accuracy, are an idea and its expression. If either factor be lacking, all talk of accuracy is empty and misleading. The city superintendent—not in Kansas—who said recently: "We use all diligence to make our children quick and accurate in fundamental conceptions as pure memory work," must have forgotten these facts. An examination of his school the other day showed his children to be unusually deficient in both respects. Drill-masters who are striving to teach children to be quick and accurate through pure memory work, or through the agency of pure drill on the formal side of arithmetic always have failed, are now failing, and must ever fail for the reason that they are trying to make bricks without straw, and

(more's the pity!) when there is available an abundance of straw. The thought-side of the work is the indispensable, inescapable, and indisputable condition to accuracy. It is clear that I am not here speaking of mechanical precision, which is quite another matter, and has its rightful place in arithmetic.

A definition of accuracy that will both work and serve as a guide in the schoolroom may be ventured at this point. *Accuracy in school arithmetic, means adequacy of expression to idea.*

All teaching that makes the pupil's ideal merely to get set results, even a large score of them, that shifts his thought from correct answers solely as a check on correct work, at once degrades his sense of accuracy, demoralizes his habits, and confuses his ideals of accuracy. Kansas teachers are not accused of such teaching; but are herewith simply warned against it.

The true conception of accuracy for arithmetic emerges for both teacher and pupil through measuring and the use of measurements. This is indeed one of the strong reasons that arithmetic work should be based on measuring, rather than on counting, ratioing, or "on the inducing of judgments of relative magnitudes," as some would have it. In measuring, the question at once arises, and remains up continually, "With what degree of closeness should measurements be made?" This question will be answered by the teacher from two points of view, and by the pupil from only one. The teacher must ascertain the smallest unit of which the pupil has, or can readily form, a working conception, and he will not attempt to require the learner to work with a much smaller unit. This is the natural limit from the educational point of view. To find it, and to keep within it, is the business of the teacher.

But the nature of the problem must guide both teacher and pupil as to the degree of practical refinement to be sought. It is in the problem that the pupil's interest focuses, not in the way of it, nor in the educational meaning of it. If the problem be to find the number of plants for his flowerbed, it is unmeaning, even foolish, to carry results to fractions. If the problem mean the cutting of a member for a playhouse, the pupil knows, quite as well as the teacher, that an eighth or a sixteenth of an inch becomes

a matter serious enough to be attended to. The problem need not call for the actual cutting, save in imagination. The pupil readily pictures to himself, from the more or less indirect suggestions of the arithmetical problem, what would be required, were he to attempt to do the actual cutting and measuring. With this measuring and cutting which he does in imagination he does not willingly take unwarranted liberties and violate metrical proprieties.

SPEED DIFFERENT WITH DIFFERENT PUPILS

A little attention to the spontaneous activities of children, when spontaneity is unchecked by adults, readily reveals that each child has a certain *norm* of speed of motor discharge. Careful observing of children at work shows an analogous norm of speed of mental activity. The child's normal mental gait is as thoroughly and characteristically a part of him as is his physical gait. At this gait he dispatches work most economically and most comfortably, and the output of his effort maintains a uniformly high quality and quantity. To this pitch the music of his soul is attuned. To this chord the rhythm of his nature most fully responds.

At this gait the child is able to maintain a steady and high potential of thought-concentration. To force him by external stimuli to work at a higher rate than his norm makes his thinking uncertain, jerky, and flighty, and soon dissipates his fund of mental energy. To permit him to work below his norm is to make his thinking wobbly, and ambling, and his attention scattering. His thought-movements resemble those of the dying top, or bicycle. Low potential activity encourages mental loafing, habituates the child to going about his tasks in a half-hearted way, and tends to satisfy him with half-achievement. It engenders and fosters effort that is below the highest levels of possibility. Thus it occurs that allowing children to work below their norm of speed and forcing them by extraneous means to go beyond it end in the same deplorable issue—dissipation, rather than concentration, of thought.

The arithmetic teacher must then study his pupils individually

to ascertain as nearly as possible the norm of speed for each. He must seek to hold the effort of the pupil to the level of this norm. He should be neither dragged, coaxed, nor spurred beyond this rate for any great length of time, if at all. The pupil will raise his norm by working within it and close up to it, but not beyond it. Dullness, stupidity, and something like mental flabbiness, resulting in enfeebled powers of concentration, are the outcome of abnormally low-potential activity; while fitful and nervous activity, issuing in a sort of hysteria, standing also for enfeebled concentration, are the end of abnormally high-potential activity. Thus do overstrained and understrained effort miss the mark of educational efficiency on the same side. I suggest that it is *dispatch,* which means a reasonably high rate of turning off work of a uniformly high grade of excellence with comfort to the workman, that arithmetic teaching should strive for, rather than for mere speed.

DRILL-WORK IN ARITHMETIC

There is also much canting speech and more canting action about drill-work in elementary-school mathematics. Time can be taken here only to indicate the pedagogical place of drill in the learning process. Teachers easily habituate themselves to dealing with the problems of education only from the view-point of the teaching process. We have scores of volumes that deal with the teaching process to one that deals explicitly with the learning process. Learning, with children as with adults, means acquiring, assimilating, and getting working control over new ideas and over processes for dealing with them. For purposes of a better understanding of it, the learning process may well be thought of as made up of three stages: viz., (1) the informal-use stage; (2) the formal-study stage; and (3) the application stage. Each of these may easily be subdivided into smaller steps as is exhibited below.

The formal-study stage of the learning process is made up of the following three pretty clearly marked steps: (1) the graphic step, in which the idea or process being learned is made to stand out before the learner in some pictured way. This is

the psychological place for geometrized arithmetic; (2) the memory-step, in which the learner makes an explicit effort to remember the formal aspect of the object of study. This is the point at which generalized, or algebraized, arithmetic is most helpful; (3) the reflex-action step, in which the learner seeks to acquire automatic control of the new possession, to the end that the mechanics of it may no longer retard, but may facilitate, thinking. This is the psychologic moment and place for drill and it belongs nowhere earlier than this in the learning process; (4) the last stage of the learning process is the application stage. The learner here uses the newly acquired possession; but now he has already made it fully his own. He uses it with design, of destined purpose, and that he may feel how much he has added to his efficiency by having mastered it. He uses it for a time alone, and then among other familiar ideas, that he may both know it as an idea and as it appears in the midst of its natural meanings and settings.

To summarize: the learning process consists of the following stages and steps:

- The learning process
  - I. The informal-use stage.
    - 1. Occasional uses.
    - 2. Collated uses.
  - II. The formal-study stage
    - 1. The graphic step.
    - 2. The memory step.
    - 3. The reflex-action step (drill).
  - III. The application stage.
    - 1. Use of the idea alone.
    - 2. Use of the idea among others.

For the pupil brisk, snappy, and properly timed drill-exercises, which never should be too long sustained, perform the following important educational offices:

1. Strengthen the power of voluntary attention, or of concentration of thought.
2. Develop facility of thought and ease of action.
3. Beget and foster a sense of growth in efficiency.
4. Cultivate quickness and sprightliness of memory.
5. Give readiness, alertness, and mechanical precision.
6. Show the need and value of knowledge that is available at the instant when, and at the spot where, it is wanted; i. e., of the "spot-cash" type of knowledge.

SUMMARY

I may now summarize most of the points I have tried to make as follows:

1. The teacher may aid independence of thought in arithmetic in the following ways:

a) By accrediting the pupil's mode of thought;

b) By habitual checking of work;

c) By emphasizing the thought side of the work;

d) By impressing the thought that in arithmetic nothing is to be taken on authority;

e) By employing many semi-original problems.

2. Teachers may make arithmetic teaching a training in choice—

a) By having pupils do things in more than one way, to find the better way;

b) By showing reasons for standard conventions;

c) By allowing pupils to use their own way until the better way appeals to them as being the better way;

d) By allowing pupils to take the consequences of their own choosing of ways;

e) By using good ways themselves and by commending good ways of working when they are used by pupils.

3. Arithmetic may be made a training in judgment—

a) By teaching rational calculating;

b) By much antecedent estimating, followed immediately by measuring and calculating;

c) By having pupils to think through lists of exercises, or problems, without figuring, and to tell definitely just how they would solve them; in cases of doubt follow with the actual solutions;

d) By having pupils always on the alert to find the easy way, even where the teacher feels quite sure his way is the easy way;

e) By asking, after solutions, always in cases of doubt, whether the result seems about what it should be;

f) By independent checking.

4. Arithmetic work may be made a valuable training in concentration of thought—

a) By brisk, snappy, drill-exercises, not too long sustained;

b) By having pupils work problems with a view to seeing how soon they can solve them correctly, the demand for speed being as natural as possible;

c) By having pupils see how many exercises they can get right in 5, 10, or 20 minutes;

d) By estimating about what results must be;

e) By postponing technique and putting drill-work in its proper place in the teaching process;

f) By working always close up to, but not beyond, the pupil's norm of speed;

g) By mental calculating, counting by 2's, 3's, 5's, 10's, 4's, etc.

5. To make arithmetic work give training in clear thinking and in reasonable accuracy—

a) Give time enough, not too much, for difficult problems to be worked and checked;

b) By diagramming and sketching of figures (pictures) to advance the pupil's power to image number-relations;

c) By doing less "talky-talking" and more chalk-talking, and by the use of cross-lined paper and blackboard;

d) By recognizing in practice that attainable accuracy is different in different grades;

e) By studying habits of thinking of pupils, and insisting always on attainable neatness and system;

f) By using problem-material in which the pupil has, or may develop, an interest.

6. Arithmetic work may be made valuable training in inference-making—

a) By much preliminary estimating;

b) By careful estimating, before figuring, about what the result must be;

c) By much use of cancellation;

d) By much citation of reasons, not rules, for steps taken;

e) By rudimentary algebraic thinking, as $3x$ is 12, what is x? $3+x$ is 8, what is x? etc.

f) By the use of indirect measurements, as to get the side,

or angle, of a triangle that cannot be measured directly but must be calculated from its relation to lines, or angles, that can be measured;

g) By asking why the result, as G.C.D., or L.C.M., etc., is what it claims to be;

h) By set exercises in inference-drawing.

I believe your adopted texts will, so soon as teachers get into their spirit and method, go far toward securing these very real, very useful, but too-long neglected, virtues of good arithmetic teaching. We are laying no specious claim to making the arithmetic easy; but we do claim not to be making it hard. Our problem is the improvement of arithmetical opportunities now running too largely to waste. The inclusion of the deeper and richer educational meanings of arithmetic among teaching aims necessarily adds something to the teacher's responsibility. But where is the teacher, worthy the name, who will not say at once that the slight additional burden—for it is but slight—is not eminently worth while, in view of the immense importance of the issues of educating children?

CONCLUSION

In conclusion, let me say modernizing the teaching and the substance of elementary-school mathematics is mainly a problem of enlarging the scope of pedagogic view, and of making methodology more natural and more childlike than has been the wont. This can be done by, and only by, giving teachers a larger, a truer, a less static, a more dynamic conception of their professional duties touching this particular subject. Teachers must believe in arithmetic as an educational agency, before they can succeed with it educationally. Great indeed is the need for a profounder pedagogic faith in the sentiment—

> I doubt not through the ages one increasing purpose runs,
> And the thoughts of men are broadened with the process of the suns—

even for the arithmetic. Then mellowed by that sweet docility of spirit that finds its sublimest expression in, "a little child shall lead," the teacher may go forth to meet the problems of improve-

ment with courage, shod with sandals of wisdom and gentleness, that knows not the words failure, defeat, and discouragement. May the larger view, the more childlike view, the more hopeful spirit, and the forward look, be the inspiring watchword and portion of us all in the labor of reconstructing the good that now is into the better that is to be!

FIELD-WORK AND NATURE-STUDY
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MENTAL ATTITUDE IN FIELD-WORK

Just as a sequence of related changes and events makes up the history of the genesis and development of a landscape so, also, it is through a connected series of experiences and associations that the individual mind comes to recognize and understand the content and history of the landscape in its true interrelations and completeness. True progress in nature-knowledge, in science, has been and is accomplished through the struggle of the mind with the unfamiliar materials and changes in nature to know things as they actually are, name, properties, origin, relationships, plus the application, through control and adaptation, of the facts discovered as relating to the needs and conveniences of man whereby he is gradually constructing out of these materials and forces his own social and industrial environment or kingdom. At every step progress has been through personal contact with the actual materials and forces and not through textbooks and lectures. In this growth I am not unmindful of imitation, of the influence of personality, of the power of one person to communicate the facts he discovers, the relationships which he detects, to other persons so that they may avoid going through the same blind hunt until they discover the truths already known. But I am quite sure that the person to whom a fact or discovery has been communicated will understand and assimilate the fact, not in proportion to what he has heard or read about the matter, but in proportion as he has searched for facts in the same manner, or is stimulated to search in some similar manner. Progress in nature-knowledge depends upon the way in which the individual mind meets and deals with the materials and changes in its environment; and the clearness and precision with which another mind grasps discovered facts

and relationships, through any form of communication, depends upon the character of the experience it has had with its nature environment and the manner in which it has dealt with these experiences. Wherever our school work touches sympathetically upon the actual experiences of the children it gains from them a ready response, and interest and activity prevail. If we wish our work to retain this vitality we must organize our courses of study so as to give pupils a broader and richer experience than the interior of our school buildings can ever afford. We must rid ourselves of the idea that we can ever accomplish anything of worth in nature-study by telling children, or by having them read, about things with which they have had little or no personal experience. We must also appreciate the fact that children need a volume of personal-interest experiences before we begin to convert them into conscious knowledge.

Abnormal mental attitudes, induced by our artificial methods in education, are constantly cropping out in our classes and giving us glimpses of the true state of the mind. A few years ago the writer went with a class of students, all of whom were high-school graduates, to a lake shore to study the work of waves. The waves were rolling in leisurely but massively. We could see the pebbles forced shoreward by the in-rush of each wave and dragged back again by the undertow; we could hear the swish and grind of this shore-drift as it was dragged back and forth by the waves. On the beach we picked up pebbles rounded and smoothed, pieces of coal, bits of broken glass, fragments of driftwood, all with the same smoothed and rounded surface as the pebbles. The students spoke of how these various fragments must have had sharp angles and edges when first broken from their main mass, and that their rounded condition must be the result of the friction in their movement by the waves. They inferred that the pebbles must have been angular fragments of rocks worn in the same manner as the coal, glass, and wood and that the sand was to a certain extent the product of the worn-off edges. I considered that we had made the observations and interpretation essential to a clear understanding of the elementary principles of the influence of waves on

shore-drift and that the facts involved had been quite thoroughly assimilated by each member of the class, when one of the students turned to me with the remark: "Now this is all perfectly clear, but how am I to know that it is really true unless I can read of it in some book?" In thinking this matter over it occurred to me that after all the connecting points were really missing; we saw no pebbles actually smoothed, no angles disappear, no sand grains formed—we inferred all. The student saw clearly the isolated facts but could not fit them together to form a chain of relationships. Only those who had pounded and rubbed stones in their childhood could really make the connection; for this our courses of study fail to provide. Fifty rods inland from the lake was a ridge, grass covered, and forested with oak. An excavation in the ridge exposed a mass of rounded pebbles and stratified sand, a duplicate of the materials found on the beach, yet the cause of the presence of that ridge was a mystery to the class. The mind which has not been furnished an adequate supply of sense experiences, nor used its experiences so as to acquire a certain independence of habit and precision in making elementary inferences as to the relations and meaning of observed facts has a poor chance of ever doing any strong work when it has to deal with materials as they exist under natural conditions. Such people will live their life and make use of socialized conditions, but they will never be positive factors in strengthening and maintaining social conditions, for they are without power to socialize the raw materials. If the memorization of knowledge, and the gaining of certain experiences through some routine, were the end, if our fund of nature-knowledge were complete, so that it was merely a thing to be learned and transmitted like the religious myths of ancient tribes, we could teach it in that way; but so long as new truths are being discovered, so long as the landscape changes, and life adapts itself to these changing conditions, so long as the mechanism of civilization is changing, we need to train the mind to deal readily with changing conditions. The mind must be kept plastic, and only a growing mind, a mind which has retained something of the plasticity of its childhood in its power and

habit of going out after, choosing, selecting, arranging, and inferring from its own sense experiences under the impulse of individual interest, desire, need or sense of duty, can remain growing and plastic. It is the limitations set by our well-defined courses of study upon true self-activity which impede growth and progress. We do not attempt to raise plants by furnishing them with just what we think they need; we establish them in rich soil and open air and supplement with such aids as our knowledge and judgment dictates. So with our pupils, we must set them first to live and grow in the richest environment which we can afford; and then minister to their needs as our knowledge and judgment dictate. We are not yet wise enough to assume complete control; we must still have faith that in many places the right response to environment is surer in free nature than under the direction of the teacher; and that the tendency will be for the child to develop and adjust himself rightly if the conditions are right. Wherever there is work to be done the mind needs to be brought into an attitude of original attack on the work at hand. The character, quality, and quantity of work accomplished will be very largely determined by the attitude of the individual toward the work he is attempting and the attitude he maintains while the work is being done. We have all had the experience of seeing classes approach a piece of work with enthusiasm, only to "bog down" before the work was fairly begun. This would not be so bad if we treated the matter as we treat other natural reactions; if we considered the child a normal and natural organism, and sought a scientific explanation for this reaction, instead of assuming that laziness and perversion is a natural attitude to be overcome by some forcing process which is not in keeping with the spirit of science as a practice nor educational in result. Effort and capacity in doing work is very largely a matter of individual purpose or desire, and this depends upon how real or essential the work seems to be to the doer; upon how much of the pupil's real self we are able to enlist in the work. The boy spins his top, picks it up, tosses, catches, and balances it on his string with marvelous precision

and skill, but in spite of our aid his writing remains clumsy and illegible.

The factor which determines the effectiveness of effort in any type of work is that of individual interest, purpose, or motive. Really to determine the working attitude of the mind is to find out the controlling interest or purpose which directs its activities in the main work at hand. There can be no strong action where the purpose is poorly defined and the feeling of a desire to do is absent.

The main individual purpose, in study, of the man engaged in scientific research, the child, and the teacher, differs in its character. In our teaching of nature-study and elementary science we have lost much in effectiveness through our failure to distinguish the character of each purpose and by trying to treat the whole under the purpose of the specialist.

In his study the man engaged in scientific research is ever on the alert for undiscovered forms, facts, and relationships, and his effort is to add something to the fund of human knowledge. He has chosen his special field of work, acquired a comprehensive grasp of its status in terms of present-day knowledge, and mastered the method and technique essential to the furthering of his knowledge in his chosen field. His real preparation for his work came after he had chosen his problem for study or investigation. His originality and resourcefulness as an investigator depend very largely upon the way he worked previous to the period of specialization.

The attitude of the elementary student in nature-study is in character closely allied to that of the special student in respect to dealing with new materials and phenomena and devising means for gaining a proper acquaintance and interpretation of the same, except that he is not facing the region of the unknown to science but the region of the unknown to himself. In attitude as regards their work, in conditions necessary to progress in their work, they are on a par; the main difference is in comprehensive grasp of subject, in accuracy of trained senses and mind, and in mastery of technique essential to progress in the work, and in all this the specialist has the decided advantage. That we

should do honor to the one for his discoveries and deprive the other of the opportunity is to say the least not in keeping with modern reason. It is through this effort to gain individual acquaintanceship and understanding of things for himself that the child acquires that knowledge and power which makes him a valuable member to the race.

The attitude of the teacher in his approach to nature subjects with his class is a very different one. He has already in mind the forms, facts, phenomena, and their interrelations, of his subject, so far as they are known or relevant to the teaching purpose at hand; he has acquired facility in recognizing things at sight and in knowing their relationships or how to set to work to determine their relationships. He brings the materials of his subject and the pupils together, not to see how effectively they may be "crammed" with the facts and relations known to him, but to see how they lay hold of the subject at hand. His attention is not focused upon the discovery of facts in nature new to science but upon facts and relationships new to the children; and his problem is that of bringing about a contact between the materials and phenomena of nature, in the most favorable way, and then to observe the influence of this contact upon mind action and training; to note whether an acquaintance is established, whether new facts and relations are acquired, whether interest is developing, senses becoming more acute, whether these new experiences are being worked out in the mind so that the realities of things are beginning to appear; and withal whether the work is calling out the initiative of the student whereby he is going out after new experiences, observing, experimenting, interpreting, independent of detail directions; whether the pupil is really laying hold of the material at hand, and to withhold his own ready-made theories while the struggle is going on, to render aid wherever and however his judgment dictates, but to avoid, so far as possible, running ahead of the pupil's interests and needs. Situations should arise, out of the child's actual experiences, which enlist his interest and effort in solving or overcoming.

If, after we have done our best in this matter, the results

are not what we expected; if the pupils have not secured the facts and recognized their relationships as we see them and desire that they should; if they do not show the interest and enthusiasm we expected, let us retain something of a scientific attitude of mind in the matter and not place the blame wholly upon the materials with which we have been working, but let us rather look for the cause of failure in our method of treatment. Mind is surely as much a product of evolution, of natural law, as a tree. If the leaves of the tree fail in their work or the roots cease to take up moisture we do not blame the tree but seek for the cause in some abnormal or diseased condition, and having found the cause we render the aid essential to a re-establishment of normal conditions. If the child is not interested in his work, says or does stupid things, does not respond in a normal way to his school environment, no longer shows that eagerness to learn which was so prominent before his school period, let us not place the blame wholly upon the pupil but let us rather, as with the tree, seek the cause in some condition in his environment which is affecting his normal response. It is full time that we begin to believe that there is usually a physical reason for abnormal reactions in children. The entire history of civilization is one ceaseless testimony of the fact "That there is no motive that clings to man as long as the desire for wisdom." That it should be so forced an affair in the schools is to say the least a paradox. That this being, so extremely sensitive and responsive to its environment, so insatiable in its desire and capacity to learn during its first five years, should, when it enters the place organized for the economic continuance of learning, become a plodder, even resist so that we deem punishment, prizes, percentages, essential to an effectual continuance of the process, is a most unnatural condition. "It is vain that we make our children haste to rise early and late take rest and devour many carefully compiled textbooks. If their relations with the laws of nature are harmoniously established from the beginning knowledge will be given to them even while they sleep."

Theoretically no institution or system should respond so readily, or be so plastic in its adjustment to every new discovery

pertaining to economic learning, as the school, but its response is extremely slow. In much of this matter there is need of considerable facing about, especially as to what constitutes real study and as to conditions and methods of stimulating genuine study; as to this matter of enforced or imposed knowledge as opposed to evolved knowledge; and in the matter of the essential mental attitude of students during their periods of study and recitation. We need to acquire ability to recognize genuine interests as contrasted with artificial interests; to know when our pupils enter into their work with the attitude of its being a personal matter, and to know when attitudes insure the accomplishment of a real purpose or work.

If our present-day fund of nature-knowledge and psychology has any one dominant value to the teacher it should be to indicate the proper method of procedure in establishing right relations between the child and his nature environment so that knowledge and power will evolve normally out of this relationship. Much valuable time has been wasted in devising courses of study designed to communicate a certain fund of knowledge, the criterion of selection being whether it was progressing in terms of subject and such as could be learned by the pupil of a given age or grade. What we really need is a course of study selected out of the child's environment, richer in content of subject-matter than any heretofore devised, the criteria of selection being its adaptation in terms of normal reaction to the psychic attitudes and tendencies of a certain age or period. So far as they relate to our nature environment these attitudes may be very generally summarized as—

1. The stage in which the child is interested in gaining a full personal acquaintance with the things around him, in finding out about this new world. In this he is impelled by a devouring curiosity the satisfaction of which is a matter of sense experience. "The cultivation of this instinctive curiosity to see, hear, handle, and secure the maximum number of sensations from any and every object is of most vital importance . . . . this inquisitiveness is naturally the vital factor in later scientific interest." The great need for out-of-door living to secure this

acquaintance and the relation of this experience to sensory training has been too fully dealt with in modern psychology to require reiteration. The truth and its proof is at hand pointing the way whenever we are ready to be guided by it. The essential thing is to spend more time out of doors, to keep in mind the unity of the landscape, to go to places where experiences, of interest to the children and essential to later and more complete interpretation, may be secured. We need to recognize the educational value of playing with pebbles and sand on the lake shore and watching the waves; of gathering flowers; of spying for birds; of wading in brooks; strolling through forests, etc.; to keep in mind that it is sympathetic contact and satisfaction of curiosity through sense experience that the child is after, rather than self-conscious knowledge; and above all to recognize that when the child has satisfied curiosity and his senses, as regards these things, there is no logical reason in his mind why he should pause to contemplate them any longer. "All these physical experiences pass up to the brain and produce some impression there. They do not constitute knowledge . . . . but they do form the unconscious material . . . . which will make his knowledge living and real and not shadowy." This failure to get a rich sense experience in childhood is father to lack of interest, originality, and initiative in youth and later manhood.

A stage slightly in advance of general sensory training is that at which children begin to take interest in connected actions or events apart from themselves, and begin to detect elementary relationships. They attach meaning to the movements of animals, can assume a certain responsibility in the care of domestic animals and pets, can appreciate the songs of birds and interpret their calls in terms of pleasure or alarm, and recognize animals by their tracks and sounds. Our course of study should scan carefully the school environment and incorporate types of experiences of this character into its course of study. Closely related are type experiences of more complex relationships. The gelatinous substance, with its black specks, found in the pond, the wriggling tadpole, and the hopping frog are to the child so many isolated objects. In the aquaria the children may

see these black specks change gradually to tadpoles, and tadpoles to frogs, and these several objects become unified through the chain of observed events. Here again our course of study should scan the school and home environment to see what it offers in the way of similar observational study—the hatching of eggs, metamorphosis of insects, germination of seeds, gullying and erosion of land during heavy rainfalls, etc. The rule should be to have children interested in things doing and in doing things. Discussions, except when children are alive with wonderment and questions generated by these things which they have observed, should be reduced to a minimum. Out of these various experiences, as children grow older, will evolve questions requiring observations controlled by a conscious purpose on the part of the pupil: the cause of change of seasons; what becomes of animals and plants during the winter; factors of control in plant growth; how land surface is molded, etc. The product of this early sense knowledge furnishes the elementary basis and data for this second type of interest which may be termed intellectual interests. This second interest exhibits itself in the form of questions; it generates problems to be solved; it is the how-and-why stage of child-life, the beginning period of purposeful observation and experimentation. It is the stage of the awakening in consciousness of the power to do, to accomplish through individual initiative; and no stage, so far as relates to development of individual power and devotion to duty, needs such careful nurturing. It is the period at which our schools determine for most pupils whether they shall be dynamic powers or human automatons. Under proper guidance there will arise naturally a felt need for controlled investigations which constitutes the pupil's true preparation for the laboratory; and no pupil is really ready for laboratory work who does not carry to it a problem to be investigated. In this matter of interpretation, of detecting relationships, we enter regions where the facts and relationships are obscured by reason of their separation in time or space, or by reason of the fact that they cannot be recorded directly by the senses. It is easy to associate egg, tadpole, and frog when we have once observed the metamorphosis.

It is fairly easy to associate the rounding and smoothing of pebbles with wave action when we pick them up on the lake shore; it is more difficult to make the association when the pebbles are found in a gravel pit several miles inland, and we may fail entirely to interpret a cliff of conglomerate rock in terms of an ancient shore line. These associations depend upon the linking together of a number of elementary observations which will form a connected chain from the shore to the gravel pit and from the gravel pit to the cliff of conglomerate. Our elementary courses need to keep in mind the elementary relationships essential to these broader generalizations and follow and direct the activities of children into regions where they may be secured. The policy of failing to do this and depending on textbook statements to make these connections will always result in that lack of power to think which is at present so prominent in our school work:

> A child brought up with a sufficiently broad basis of this kind is always at home in the world. He stands within the pale. He is acquainted with nature and nature is in a certain sense acquainted with him. Whereas the child brought up . . . . with but little acquaintance with anything but the printed page is always afflicted with a certain remoteness from the actual facts of life, and a certain insecurity of consciousness which makes him a kind of an alien on the earth in which he ought to feel himself perfectly at home.[1]

Schoolwork is not suffering through lack of subject-matter but through failure to utilize to the end of educational effectiveness the common materials near at hand, through failure to recognize the value and educational content of the common things about us. We need to do more to lead pupils to appreciate the fact that the human race, since its beginning, has had nothing but these same common materials of earth, climate, life, and natural forces to study and utilize, and that during the ages these things themselves have undergone but little change. The great change has been in the attitudes of the people themselves, in the things they have found out about these various things, in the way they have used these things to aid them, and in the character and quality of their thinking.

[1] James, *Talks to Teachers.*

At some stage in the work the children should learn something of the history of the origin and growth of certain great conceptions, how great new ideas were evolved, some of the pioneers of new ideas, and how these pioneers and their ideas were received by the public. They should know something of the way in which new ideas had to struggle with old ideas to dislodge them before they could make any headway in the world. We need to develop liberal-mindedness, respect for authority, and above all how to question authority and to distinguish between prejudice and intelligent criticism.

Increase in the pupil's experience should be paralleled by information giving him corresponding increase in breadth of view of the history of the growth of knowledge and its application to progress. The efficiency of elementary field-work, of elementary education as a whole, must be judged in its totality by some standard more comprehensive than that of the successful daily recitation. Its ultimate test must be in the character of its accumulated influence on the individual, both as to right thinking and right action. If field-work had no other value it would be worth while to take pupils out of the schoolroom as a means for testing what we are doing, to develop alertness, individual initiative, and self-control. But because we are all too conscious that we are doing so little, that children are so unmanageable, and that we ourselves can explain nature better and with less fear of contradiction in the schoolroom than we can in the field and wood, or by the lake shore, we avoid the open altogether or use it but half-heartedly at its best, and then try to have it fit our books, rather than having our books fit it.

The essential factor in field-work, as in any type of schoolwork, is a comprehensive definite motive on the part of the instructor and of the school as a unit, in which the from-day-to-day lessons are steps toward this comprehensive end. Information gained through ample sense experience, impelled by strong interests, and directed by definite motives, imparts a quality to the individual quite apart from the facts learned themselves and which remains to mark the efficiency of the individual long after the several facts are forgotten.

A REPORT OF THE FIRST ANNUAL MEETING OF THE NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION

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The National Society for the Promotion of Industrial Education was organized in New York, November 16, 17, 1906. Its great leaders (and it has great leaders) intended it to be a common meeting-ground for manufacturers, representatives of labor, social reformers, and teachers who recognize the industries as materials for education. The difficulties in the way of a society made up of such diverse elements are obvious. Each feels considerable distrust toward the other, or at least is inclined, as one party phrased it, to be "cautious." It is partly because of the conflicting and partial utterances heard from the same platform that the meeting, as a whole, was one of unusual interest. Because everybody heard so many ideas advocated that he could not accept, it was stimulating. And because the society is intended to be an organization which permits free expression, it certainly is one of great promise.

In submitting the following report, the writer is inclined to make few comments. It may not be out of place, however, to suggest to the reader the wisdom of looking for the germ of truth in the various statements, and likewise the importance of discovering the limitations of each party. For it is not the bad citizen that we have to fear so much as the good one who fails to discover the boundary line between those subjects upon which he speaks with and without authority.

The session Friday morning was presided over by Carrol D. Wright, president of Clark College, and former U. S. commissioner of labor. The subject under consideration was "The Apprenticeship System as a Means of Promoting Industrial Efficiency." The programme was so planned as to include ad-

dresses from a manufacturer, a trades-union man, and a man from a technical school. In a few introductory remarks Mr. Wright stated that the old apprenticeship system which began to decline with the introduction of labor-saving machinery has given place to a new system of apprenticeship. Referring to this new system, Mr. Wright said:

> It would be too much to insist that the apprenticeship system answers the whole demand for industrial education. It is quite as needless to insist that the industrial school furnishes everything in the way of vocational equipment that can be gained through a thorough apprenticeship system. What is needed is an enlightened system that shall secure for the youth all that can be gained from an apprenticeship and all that can be gained from modern schools for trades and industrial education generally. We need a training that will secure good trade people and good citizens.

Mr. W. R. Warner, of the Warner & Swasey Co., Cleveland, Ohio, spoke as follows:

> A man without an education may be likened to an automatic traveling crane worth $1.50 per day. Give the man an education and you raise his price. The old apprenticeship training is not obsolete, but it is changed. Today it is more specialized than formerly.
>
> The motive of the manufacturer in regard to any form of industrial education is purely commercial; we need not try to disguise this fact. The motive of the schools is philanthropic. Can the two motives be combined?

Mr. Warner answered his own question in the affirmative and attempted to illustrate the good influence of the manufacturer over boys. He admitted that many boys failed, but said that there were failures in the schools. He criticized all our educational institutions as having too little of the practical, and teachers of technical schools as being inefficient. He insisted that pupils cannot think alone and that many teachers in technical schools know so little of practical operations that their instruction is of little value.

Mr. J. F. Deems, general superintendent of motive power, New York Central lines, spoke on "Trade Instruction in Large Establishments." He urged the need of industrial education at present and described the shops of the New York Central, where there are now six hundred apprentices employed learning the various trades in connection with railroad work. He believes

that it is best to educate the boy in the trade, not out of it, and that the trade school can never have the atmosphere of the shop.

Night schools are failures [he continued], instruction should be given during work hours when the men are under pay. The public schools can help in this education by giving more instruction in applied arithmetic, and in the useful laws of nature. The public schools should have a curriculum that will hold the boy in school; but the United States must look mainly to the apprenticeship system for its salvation.

Mr. James O'Connell, president of he International Union of Machinists, Washington, D. C., being absent on account of business, his place was filled by Mr. W. B. Prescott, former president of the International Typographical Union, who read a paper on "The Value of a Thorough Apprenticeship to the Wage-Earner."

The apprenticeship system [said Mr. Prescott] is a survival of feudalism; its object is not to make a man, but to make money. The foreman wants results and he wants them right away. They must appear on this month's balance-sheet. The trades-unions have been blamed for the decline of the apprenticeship system. The unions feel the need of more skill than such a system gives; they feel that this system sacrifices the boy's interests for quick profits. Under specialists a trade is cut up so that a boy can neither beg, borrow, nor steal a trade. Leisure is the basis of culture and workers must share in this. When hours are long a trade education is impossible. Under long hours there is a mental stagnation and brutalization.

As an illustration of what a trade-union can do in industrial education, Mr. Prescott spoke of the work done by the National Typographical Union.

The members of this union, feeling the need of greater skill, decided to lay the basis for it in a better education. The territory to be covered was the North American continent, and hence the suggestion to establish schools was rejected on account of the expense. It was decided, however, to establish a correspondence school, charging $20 per annum for instruction and the necessary apparatus, and granting a rebate of $5 to deserving students. Believing that the field of the printer as at present recognized should be expanded so as to include a knowledge of the principles of art and their application to the work of the printer, the correspondence school offered a course treating of these subjects. In this way it is hoped to restore to the printer's art the artistic qualities which it originally possessed. The school is open to all. Correspondence instruction enables the student to receive the criticism of experts during the period of instruction and the privilege of submitting problems for help at any later time.

The tragedy of the workshops [Mr. Prescott continued] is not so much the physical accidents as the mental stagnation. The motive of the Typographical Union is to keep the mind alive. The trades-unions are not opposed to industrial education, though they may be opposed to certain schemes masquerading under the name of education. They do not object to the study of economics, but they do object to instruction which leads students to think that Adam Smith spoke the last word on economic questions, not the first. What the unions are opposed to is not education, but subterfuges. The workingmen are interested in industrial education and should have a hand in it. Where are the students of your schools to come from if the working-class is against you? It behooves the friends of industrial education not to oppose labor. The skilled man is treated as an impersonal unit. He wants to be treated less like a prisoner of necessity and more like a free man. Soft words at public functions will not suffice. We must have an industrial education that is broad enough to offer opportunity to those who desire to improve.

Mr. Leslie W. Miller, principal of the Pennsylvania School of Industrial Art, Philadelphia, next spoke, on "The Necessity for Apprenticeships."

The apprenticeship system is not dead [said Mr. Miller], but its methods are refined and readjusted. If you think you are going to ignore this truth and transfer schoolboys into the workshops without getting articulated, you are making a tremendous mistake.

Industrial education in the elementary school is a waste of public money; the schoolmaster is extinct and the schoolmistress has it all her own way. If you think women are going to teach sloyd and weaving you are mightily mistaken. Why do *all* the little boys want to be put to the carpenter's tools? It is absurd on the face of it. Industrial education should be a matter of selection; select one and leave nine hundred and ninety-nine. It is a mistake to try to make skilled workmen out of schoolboys. I am in sympathy with Mr. Warren on this matter. The educational system has failed; it is a waste of public money. The apprenticeship system is not dead; it must be controlled. I would not underestimate the trade school, but you must first catch your boy. The apprenticeship idea must dominate; it is the method that will get most money.

The subject under discussion Friday afternoon was "The Place of the Trade School in Industrial Education." Dr. Henry S. Pritchett, president of the Carnegie Foundation for the Advancement of Science and president of the society, presided. The principal speakers were Mr. Charles F. Perry, director of the Public School of Trades, Milwaukee, Wis.; Mr. Milton P. Higgins, president of the Norton Companies, Worcester, Mass.;

and Dr. Graham Taylor, director of the Chicago Institute of Social Sciences, Chicago. Mr. Perry explained the workings of the trade school in Milwaukee, which is under the supervision of the board of education. He believes that the demand for skilled workers is not supplied and that trade schools can help supply this demand, but that they should not be run by private individuals for the exploitation of the youth.

Mr. Higgins said, "Our trade schools have been largely schools with a shop attachment. What they should be is shops with a school attachment. The shop of the typical trade school must be a productive one."

Dr. Graham Taylor insisted on the need of training in occupations from the kindergarten up.

> By keeping boys and girls in the schools during the period from fourteen to sixteen years [he said] we safeguard the most dangerous period. By making use of industrial education in the schools, hereditary skill may be preserved and developed so that the trade and guild secrets may become the open secrets to all who will use them. The interests of the people must be safeguarded, however. The public must guard itself against an unlimited apprenticeship system, where the natural resources are monopolized. If by increasing the number of skilled workers we reduce the standard of living, you must not wonder that the leaders of the trades-unions are cautious in this matter. They have a right to protect their property interests in their skill. Trade schools should include in their curricula, in addition to what they now have, industrial history and psychology. One of the most serious difficulties in dealing with modern problems is that the parties have no perspective. More attention to the human elements in the problem would be of the greatest value. To discuss trade schools without reference to the co-operation of labor would be to discuss *Hamlet* with Hamlet omitted.

Among those who took part in the discussion were Miss Florence M. Marshall, director of the Trade School for Girls, Boston; Mr. Williston, of Pratt Institute, Brooklyn; and an instructor from the University of Cincinnati. Miss Marshall said that the untrained girl is a menace to our shops as well as to our homes and that where women workers are unskilled the type of civilization is low. Since so many women have charge of homes, Miss Marshall believes it wise to put the emphasis upon the duties of a director of consumption rather than upon those of the direct producer.

Mr. Williston stated that it was hardly right for manufacturers to call upon the state for that which they can provide themselves.

An instructor from the University of Cincinnati told of a most interesting experiment being carried on in that city by the co-operation of the university with the shops. Shops are used as a laboratory for the class instruction and thus far the results are gratifying.

With the exception of a stirring address by Mrs. Anna Carlin Spencer, of the Ethical Culture Society, N. Y., the education of girls was almost overlooked. This was due, no doubt, to the fact that the conception of industrial education in the minds of a majority of the speakers is that of a money-making device, limited to purely technical and trade ideas. Mrs. Spencer enumerated four fallacies underlying the belief that girls do not require an industrial education, and showed why their education presents a more complex problem than that of boys. She would have industrial training begin in the kindergarten and continue throughout successive years. She made a plea for a broad and simple foundation in the early years. "Keep your machine-shop away," she said, "until the child knows what life is."

At an after-meeting called by Miss Addams at Hull House to discuss the industrial education of women, Miss Marshall, director of the Trade School for Girls, Boston, was the principal speaker. She told of the training given in that school to girls from fourteen to sixteen years. Although Mrs. Raymond Robins and others attempted to turn the discussion into broader fields, most of the attention was given to a type of school which to many present seemed but a temporary device to tide a few destitute girls of a particular locality over a few years. Mr. Frank A. Manny, however, briefly indicated the meaning of a broader plan of industrial education and a gentleman from Helena, Mont., told of the action of that state in paying the expenses of children whose parents are not able to keep them in school.

Without attempting to outline the papers presented at the meeting held Saturday morning when the discussion centered

around "The True Ideal of a Public-School System That Aims to Benefit All," it may not be amiss to state that there were as many different views expressed as there were interests represented. One would have industrial training in the hands of the public schools; another would have the public schools have nothing to do with industrial training. Some would have the schools stand for culture; others would have nothing partaking of the nature of culture in the industrial schools. In the five minutes allotted to Miss Jane Addams she gave more that was really illuminating on the whole situation than was heard at any time during the meeting. Recognizing the value of industrial training from the earliest years on, she would have it in the public schools, having its character change with the changes that come in muscular control, in interests, and in intellectual power through natural growth, Thus she would, during the seventh and eighth grades, have more attention given to skill than formerly; and, from one point of view, the handwork of this period might be termed vocational training; but she insisted that it would be a bold teacher indeed who would attempt to decide what the future work of a fourteen-year-old child should be. She also spoke of the danger at present of having the *schools captured by the manufacturers* just as several decades ago they were captured by the business men. She attempted in the few moments at her disposal to show that there is no intrinsic opposition between industrial education and culture—between work and culture—and that the child, who, in connection with his industrial occupations, has the opportunity to learn of their origin and development and the social conditions which determine and are determined by them, is getting culture in the truest sense of the term.

EDITORIAL NOTES

INDUSTRIAL EDUCATION

The Manufacturer in the Educational Situation

When the educator talks of reforms in the school system we listen with complaisance. Our emotions are mildly stirred by the pros and cons of the situation. With a sense of secure comfort in a bit of intellectual stimulus we have little real concern for the immediate future. When the leaders of industry backed by the manufacturing interests of the country take a hand in the discussion we lean forward in our seats—something is going to happen. It suddenly dawns upon us that epoch-making forces are at work and that the school system must be irresistibly drawn into their current. Such was the experience of those who attended the January meetings of the National Society for the Promotion of Industrial Education.

That industrial education was the solution of the greatest number of the defects in the school seemed to be an accepted fact.

Efficiency in the Trade School

Interest was most intense on the question of what kind of industrial training would be effective. Even in its most specialized form—the trade school—it may evidently be of two kinds.

Mr. Morse, of the Massachusetts commission on industrial education mentioned that in Switzerland an apprenticeship was such that a man learned the mathematics and the physics, in fact, the whole process of making watches or music boxes. When the music-box industry was suddenly swept away by the invention of the phonograph, the entire mass of workmen, without previous training, began to manufacture motor cycles. In other words, the breadth of experience during their apprenticeship had developed the men to such an extent that they were fitted to meet new problems. What is this but culture?

There is another kind of apprenticeship which fits the man to do but one thing. In a comparatively short time, by a purely imitative process he acquires specific skill. Such a workman

can turn a screw just as well as the former. The manufacturer needs only the piece-worker; therefore why produce the finer human product?

Here is the issue that concerns the future of that class of our boys and girls who at twelve and fourteen meet the stress of real life. It is to be hoped that the very conditions of supply and demand will place a premium upon the laborer who can adjust himself to the changes of the labor market.

There are analogous problems within the grammar and high schools. Is emphasis to be placed upon specific results or upon the kind of control which comes through a rich intellectual process?

Education of Americans' Initiative and Adaptability

We pride ourselves on the all-around Yankee ingenuity and adaptability of Americans. No one would consciously permit any practice to enter the school which might limit the future initiative of our people. Indeed the present movement may be taken as a wide-spread effort to develop these resources. One point in the matter seems to warrant most watchful study by the educator. Practice being somewhat controlled by habit, is much more persistent than theory. Consequently methods of organization and teaching any form of technical work do not begin to change as much as the theories which account for them. What is more probable therefore, than that the methods of the specialized forms of industrial education will find their way into the practices of the public school? The valuations of the trade school would thus be placed upon work which should aim at a broader result. Failure of industrial occupations to educate will come not from lack of right ideals but from the insidious nature of false methods.

Influence of Trade School on the School at Large

As one turns over his memories of these conferences, the immediate questions then seem to be about as follows: Is the trade school the solution of the truancy problem and does it serve the best interests of the young wage-earner? Which trade school are we to have? Is it to be the one that aims first to develop a man and then a

Summary

workman, or is it to be the one that manufactures a human cog in a machine? How will the trade school affect the ideals governing industrial phases of general education? Will it prove the cultural value of technical training? Will there be an increase of industrial work in the general curriculum or will the tendency be to remove it from the demoralizing influence of the pedagogue to the supervision of the man who has come up from the bench?

Plan of the Department

It is of interest just here to note that the Department of Superintendence of the N. E. A. at its February meeting devoted a session to the consideration of the question of the place of Industries in Public Education. So largely do these questions appear in the foreground of all educational discussion that this journal will, in the future, give them special attention. We intend to note such meetings as will consider any related topics, and also the current magazine articles which deal with the situation. We are happy in the promise of contributions from those who are among the ranks of actual workers and investigators. It is our hope therefore, that we may make this department of value in keeping before our readers the live issues of the day. L. S. C.

Industrial Education and Trade Schools

It is with a real relief that those interested in the problem of our common-school education must recognize the new factor which is making itself evident in public consciousness: industrial education and trade schools. On the one hand our school systems have become so huge that educational measures can hardly command consideration upon their merits nor a field within which they can try themselves out, because the administrative problems have become too enormous and too immediately pressing to allow room for much beside themselves. And on the other hand educational reform has been prone to back up its programme by an appeal to the reality of the life outside the schoolroom, which it has never yet been able to bring inside. The mere fact that vast industrial interests demand trade schools to supply them with the skilled labor of which they are in need, indicates the presence of as real a problem in elementary and

secondary education as the professional school has brought with it into the college and the university. Just as the demands of the community have increased upon its professional men, calling for skill that can only come with extended and directed training so our manufactories are calling for the skill, the competence, the ability to take responsibility which is born only of conscious technical skill and intelligently organized habits. The demand is in no small degree an admission that the specialized factory work does not train its own foremen and mechanics. Identification with specific pieces of machinery till the workman almost becomes a part of the mechanism, and the morale of the factory which is reduced to "speeding up," build up neither mind nor character. Foremen have been sought among those trained in the smaller country shops where varied occupation and responsibility for a whole product have produced the mechanic.

Demands of Industry upon the Schools Comparable to Those Made upon the Universities

There is little reason to doubt that our manufacturers, with the recognition of the need, and with the example of other countries in meeting it by trade schools, will by themselves if necessary supply their own demands for skilled men. Not a few concerns have already their own schools, and with the advantages that follow from these instances others will arise, but the educational value of this sort of schooling and the necessity of fitting it into the educational system of the country inevitably will bring it within the domain of the present common schools.

There arise at once two questions. How will these technical schools fit into the secondary system? And what is to be their relation to the elementary schools? It is not difficult to conceive of a secondary-school system which shall make these trade schools a part of itself, which will carry theoretical studies along with the practice in the shops, thus giving double value to each. Such a system in connection with the University of Cincinnati already exists in a trade school inaugurated by a manufactory in that city. The value of the shop work for study has shown itself in no uncertain way. The situation presents no

Problems Involved for Secondary and Elementary Schools

problem here that is in principle difficult of solution. The relation of this industrial training on the other hand to the elementary schools is by no means clear.

It is possible that they should have no relation, except that of preparation. In the elementary school the boy or girl might gain simply the control over language and number, the historical and scientific information which such schools are supposed to give, and await the secondary period to come into touch with industrial training. There are two reasons why this should and probably will not be the outcome. In the first place there will be an added advantage for the child who is going into trade schools, if he has had training of this industrial character, even before he is able to enter the trade schools themselves in the secondary period. Something of the nature of manual training extended all through the elementary period would fit the child for the later handling of tools, would give the education of muscles, of motor centers that is too precious to be lost, especially when the period of education is so restricted at best. The industrial school of the secondary period will inevitably extend its influence into earlier training, just as the medical and law schools have indicated premedical and prelegal courses in the university.

Value of Industrial Training for the Schools

On the other hand the school itself is in need of just the reality, which relationship with the occupations of the community gives, to give it a hold upon its pupils, and to give the pupils a hold upon what they study. The discipline of doing something and making something that is real, that is demanded by the great world into which the child longs to go, is the ideal that we look for in vain. It is inconceivable that in the end this all-important means of developing mind and character should not be taken possession of by the elementary school.

The profoundest problem arises at this point for both the secondary- and the elementary-school systems. Will trade schools develop into class schools? Will they become as narrow as the specific skill which they inculcate? Will the democratic conception which has pervaded our common schools be lost? When all the children of the community are gathered together to learn

what it is essential that all should acquire, a democratic spirit is aroused that will be lost if the child is as early as possible drafted into a school which trains with an eye single to the occupation he is to follow in later years.

Interpretation of Industry by the Use of the Historical Method

The problem of meeting a narrow class attitude with a broad democratic spirit and at the same time making use of the sense of reality, which comes with constructive work as the trade school inculcates it, is the problem of interpreting the industrial activities of the community. It is the problem which in simpler forms of society has been solved by the introduction of the child into the religious and other social institutions and practices of the community. It is the problem upon which our schools have made a beginning of attack in the use of the historical presentation of social origins, of industries, and commerce. History in the common schools has suffered still more than in our colleges and universities from its exclusively political interest. It is beginning to face about toward the industrial development of the community, and in doing so comes for the first time into contact with the real problems of daily life of the majority of its citizens. The great difficulty which such a use of historical method meets is the lack of immediate contact with life which would lift the child out of story-telling into actual interpretation. How much this difficulty would be lightened if the child were actually at work in a trade, or were preparing consciously for such work within the school system is at once evident. A moment's review of the broadening effect of the sweep of industrial and commercial effort and growth into the study of our political history will make it evident that, especially for children, this point of view will enlarge rather than narrow the value of history in the curriculum. The great defect of the study of social beginnings and growth in the common schools has been that they have been presented from a literary point of view. And this has been largely necessary because only in literature could a point of departure within the child's ken be found. If this point of departure could be found in the actual instruction

in trade schools, the grip gained upon subject-matter and its history would be enormous.

Learning a Trade Could Be Made the Basis of the Best Schooling

It used to be an ideal of the community that every child should learn a trade, an ideal which curiously enough finds one of its actualizations in the training of the children of the house of the Hohenzollerns. It has never been demonstrated that the best education which any child could get in the common-school period would not be gathered about the learning of a trade, in a school which could give not only the specific skill but also the interpretation thereof in the history of our industrial community, and would be able to associate the child's expression in language, and problems in number, about such a reality. These ideas are very much in the air. They are supposed to exist largely in the minds and writings of educators who are considered visionary; but any careful study of them will show that they are quite consonant with the development of the social sciences and professional schools in our universities, that the obstacles which stand in the way of their realization are either those of school administration or those of an unwitting class distinction, which has placed bookish learning above manual skill, even when intelligently informed. It is a sign of good omen for the future that in the place of the school reaching out somewhat helpless hands toward the realities of the life that lies around it, we should find industrial society knocking at the doors of the schoolhouse seeking admittance.

G. H. M.

NOTES AND NEWS

Interest in folk-dances appears to be spreading. The *Teachers Magazine* for February contains the first of a series of articles descriptive of these dances. Some of them are used in the New York schools, and in many other schools in various parts of the country.

Albert E. Roberts comments with favor in the *London Journal of Education* on the "American habit" of sometimes allowing pupils to correct each other's compositions under the teacher's general direction. He finds that it cultivates an active attitude on the part of the pupil, and a greater attention to the corrections made.

The group system of class teaching is reported as successful in Rochester. It allows the child more latitude, provides for individual promotion, and reaches the child more directly. According to Superintendent Carroll in the *Atlantic Educational Journal,* it is gaining ground in New York state, while in New England it is almost universal.

The *Educational Review* for January contains an account of legal regulation of minimum salaries for teachers, both in this country and abroad. It finds this regulation existing in those countries most advanced in education. Some of our states have laws on this subject, and in a dozen more there is a prospect of such regulation in the near future.

Mr. William Kent, of Chicago, has recently deeded to the United States 295 acres of the primeval redwood forest on the southern slope of Mount Tamalpais. This territory is about six miles from San Francisco. This most commendable gift saves to the world one more portion of one of the greatest of all displays of natural-history phenomena.

The last stronghold of child labor in New York, the tenement home, has been invaded in an investigation by the Depart-

ment of Labor. "Many children of school age and even under have been found in them at work in regular employment," says *Charities*. "Some measures should be adopted to correct this weakest spot in the New York child-labor law."

The *North Carolina Journal of Education* contains an account of the systematic campaign of the last four years for the improvement of education in that state. "The school fund has been nearly doubled, the number of local tax districts has been increased from 30 to about 600 and modern schoolhouses have been erected at an average rate of one a day."

In Sweden the women teachers in primary schools, which are conducted by the state, are far better paid than those in secondary schools, which are only subsidized by the state. Such is Mr. J. S. Thornton's statement in a special report made to the English Board of Education. This situation, together with other conflicts between "public and private effort," leads to certain rather difficult problems.

The fourth annual report of the education department of New York state, transmitted to the legislature late in January, shows an expenditure of nearly fifty millions of dollars for common schools. The average cost per pupil, based on attendance, was not quite fifty dollars. This shows an increase in expense of about 2 per cent. Of the teachers in the elementary schools, about one-twelfth are men, as shown by the report.

Bulletin 195 of the office of Experiment Station of the U. S. Department of Agriculture treats of "Simple Exercises Illustrating Some Applications of Chemistry to Agriculture." Directions are given for the performance of twenty-eight simple and practical experiments. These relate to the materials and processes of making plant foods, to plant products, and to soils. The experiments are sufficiently simple for use in upper-grade natural-history classes.

Railways may be compelled by the state to carry children to and from school at half-price, is the decree of the Supreme Court, as reported by the *Outlook*. The case arose in Attle-

borough where the street-railway company declared that this meant a loss to them. This the higher courts denied. But their decision was based chiefly on the fact that the discrimination was not an arbitrary one, but in pursuance of the long-established policy to encourage education.

In his annual report to the New York Board of Education Superintendent Maxwell declares his dissatisfaction with the working of the present compulsory-education law. He suggests the extension of the age limit to sixteen, and would give the board power to compel parents to provide for the physical and medical needs of their children in such a way that they shall be fit to attend school. He does not seem to suggest any adequate way of bringing about such a compulsion.

Articles that appear in recent numbers of the Indiana and Illinois State Board of Health bulletins suggest that teachers in hygiene could find a source of much interesting and valuable information by securing these bulletins. The December Illinois bulletin gives a number of valuable articles on avoidance, prevention, and cure of tuberculosis, as well as descriptions of the open-air cure as it is now being administered in Illinois. A large amount of data which every teacher should know is presented.

An amusing account of an innovation in nature-study is given in the *Atlantic Educational Journal* for January. A third-grade teacher in Baltimore has inaugurated a "pets' visiting day," upon which children may bring their pet animals to the school. She contrives to endure this day once a week. Pigeons, chickens, white rats, kittens, dogs, rabbits, a parrot, and a carrier pigeon have figured among the attractions. The only exception so far made was in the case of a pet goat with a dangerous reputation.

Geology for the grades would be an appropriate subtitle for Mr. Paul's article in the January number of the *Utah Educational Review*. He gives an outline of work beginning with the first grade, and especially adapted to the children of Utah who

would naturally be supposed to be interested in mines and metals. Beginning with play and work in sand, clay, and pebbles, he brings the children, by the time they have finished the grades, to chemical studies of limestone and other minerals, and to the consideration of crystallization and kindred facts.

The Bureau of Education of the United States has recently published a bulletin upon the subject of *Agricultural Education, Including Nature-Study and School Gardens,* by James Ralph Jewell. To the first section of the bulletin on nature-study fourteen pages are given, twenty-four pages are given to school gardens, and eighty-one pages to elementary agricultural education. A brief and somewhat incomplete historical statement is made of each of the three topics. A good bibliography is presented along with the discussion. The bulletin will be found highly valuable to those interested in natural-history education.

The joint report of the meeting held by the Eastern Art Teachers' Association, the Eastern Manual Training Association, and the Western Drawing and Manual Training Association in Cleveland, Ohio, May 8 to 11, 1907, has just been issued. It is especially valuable as a representative of the current thought on art and manual training.

"Manual Training at Hampton Institute and Its Relation to the Trades," a paper by John H. Jinks appearing in *Manual Training Magazine* for February, 1908, pp. 200–11; "The Manual Arts as School Subjects," by Harriet Cecil Magee in *The Educational Bi-Monthly* for February, pp. 256–61; and "Ethical and Esthetic Bearings of Handwork," by W. N. Hailman, *ibid.*, pp. 262–70, are recent contributions which are recommended to those interested in the subject.

BOOK REVIEWS

Commercial Raw Materials: Their Origin, Preparation, and Uses. By CHARLES R. TOOTHAKER. Boston: Ginn & Co. Pp. 108.

This book contains a concise description relating to the origin, preparation, and uses of over twelve hundred commercial products, accompanied by fifty maps and numerous illustrations showing the sources of raw materials and methods of preparation for the markets.

The grouping adopted is into substances of vegetable, mineral, and animal origin. Under the grouping of plants the ones first described are food-yielding, followed by those yielding both food and fiber, and then those, like the cotton plant, which supply fiber, oil, and cattle food. All materials yielded by one plant are grouped together. This same classification is used, as far as possible, with the substances of animal and mineral origin.

The book was prepared primarily as a work of reference to collections of commerical materials arranged for the schools of Pennsylvania by the Philadelphia museums but should prove a valuable aid to teachers and students interested in commercial geography and the industrial sciences.

I. B. M.

SCHOOL OF EDUCATION
Chicago

Rural School Agriculture. By CHARLES M. DAVIS. New York: Orange Judd Company. Illustrated. Pp. 270. $1.00.

This book is a manual of 143 exercises on the problems of the farm. These problems embrace such topics as the character and properties of soils, the treatment of various field crops, the testing of seeds, the effect of various chemicals and fertilizers on plants, grafting, transplanting, pruning, and spraying, as well as other more strictly botanical or entomological topics. A series of sixteen suggestive exercises is given for the field and laboratory study of corn. In each exercise the problem is definitely stated and directions are given for its solution.

The teacher who wishes to establish a closer contact between the school and the home life of a rural community will find these exercises very helpful. They show how the laboratory method may be introduced in the study of the questions arising from the pupil's experience on the farm or in the school garden. Most of the work suggested may be done in the ordinary schoolroom or in the field, with easily obtained material and very simple apparatus. The good teacher will use this book to suggest a series of exercises suited to his particular needs rather than as a manual to be placed in the hands of the pupils.

The illustrations are good and add much to the value of the volume.

GEORGE D. FULLER

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BOOKS RECEIVED

HENRY ALTEMUS CO.

Poor Richard Jr.'s Almanack. Reprinted from *The Saturday Evening Post*, of Philadelphia. Illuminated. P. 128. Boards, 50 cents.

HOLBROOK BARKER CO., CHICAGO

Play—Its Value; and Fifty Games. By NINA B. LAMKIN. Cloth. Illustrated. Pp. 94.

A. S. BARNES & CO., NEW YORK

Filippo the Italian Boy. By LAURA B. STARR. Cloth. Illustrated. Pp. 112. 2 copies.

Hints and Helps from Many Schoolrooms. Arranged by CAROLINE S. GRIFFIN. Cloth. Pp. 182.

Little Talks on School Management. By RANDALL N. SAUNDERS. Cloth. Pp. 68.

WASHINGTON GOVERNMENT PRINTING OFFICE

Annual Report of the Board of Regents (of the Smithsonian Institute). Cloth. Illustrated. Pp. 546.

Agricultural Education. By JAMES RALPH JEWELL. Paper. Pp. 140. Bulletin: No. 2, 1907. Whole number 368.

THE MACMILLAN CO., NEW YORK

Linguistic Development and Education. By M. V. O'SHEA. Cloth. Pp. xviii+350.

R. B. Sheridan's Plays ("The Rivals" and the "School for Scandal"). Edited with Introduction and Notes by WILL DAVID HOWE, PH.D. Cloth. Pp. xxxiii+320. $0.25 net.

Lamb's Tales from Shakespeare. Edited, with an Introduction, by REV. ALFRED AINGER, M.A. Pp. xiii+368. Cloth. $0.25 net.

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Smith's New Intermedial Copy Books. Paper. Pp. 24. 60 cts. net per dozen. 6 numbers. 2 sets.

D. APPLETON & CO., NEW YORK

When Men Grew Tall or the Story of Andrew Jackson. By ALFRED HENRY LEWIS. Illustrated. Cloth. Pp. 331.

GINN AND COMPANY, CHICAGO

From Trail to Railway Through the Appalachians. By ALBERT PERRY BRIGHAM, A.M. Cloth, 12mo. Illustrated. Pp. 786. Net $0.50; postpaid $0.55.

Moral Training in the Public Schools. The California Prize Essays. By C. E. RUGH, T. P. STEVENSON, E. D. STARBUCK, FRANK CRAMER, G. E. MYERS. Cloth, 12mo. Pp. 208.

Commercial Raw Materials. By CHARLES R. TOOTHAKER. Cloth, 8vo. Pp. 108. Net $1.25; postpaid, $1.35.